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DOES CLASSROOM QUALITY PROMOTE PRESCHOOLERS' LEARNING?

A Conceptual Framework for Evaluating the Impact of Classroom Quality on Child Outcomes

esearchers agree that for children who attend early care and education programs, high-quality early learning experiences are critical for promoting academic, social-emotional, and executive function skills, particularly for children of color and children from families with low incomes.¹ This consensus is based on the premise that children's experiences and interactions with teachers and peers are key drivers of their learning and development. There is also substantial research that shows small but consistent associations between classroom quality and preschoolers' language, academic achievement, and social-emotional outcomes.²

The majority of research demonstrating these links is correlational, showing better quality is associated with better child outcomes. However, this does not prove that investments aimed at improving classroom quality will *cause* better child outcomes; more study is needed to rigorously test this link. Further, open questions remain. For instance, which specific dimensions of quality matter most? Are there particular levels or thresholds of quality that must be reached to consistently promote children's learning and development? How can classroom quality be improved at scale?

Rigorous research testing the effects of interventions to enhance classroom quality has found that providing professional development to teachers, including ongoing training and coaching, can improve classroom quality and teachers' instructional practices as well as children's outcomes. These benefits are particularly noticeable when professional development is focused on a specific curriculum or set of teacher practices. Yet, again, questions

remain. When and for which children do quality enhancement efforts have the most impact? When and for which early care and education centers and teachers can quality enhancement efforts be implemented successfully? Answering these questions will help the early care and education field target investments in ways that are more likely to support classroom quality and help all children succeed.

The Variations in Implementation of Quality Interventions (VIQI): Examining the Quality-Child Outcomes Relationship in Child Care and Early Education project aims to tackle these open questions and build substantial new evidence to inform policies and practices in Head Start and community-based child care centers. The VIQI project is a large-scale, rigorous study that examines the link between classroom quality and preschool children's developmental outcomes. It builds on and extends prior research—including the Child Care and Early Education Quality Features, Thresholds and Dosage and Child Outcomes (Q-DOT) project. This prior work suggests that when classroom quality is in the higher portion of the quality range, links between quality and children's outcomes are stronger than when classroom quality is in the lower portion of the quality range.

This brief describes the VIQI project, its key research questions, and the conceptual framework underlying it.

THE VIQI PROJECT

Launched in 2016, the VIQI project is a multiyear initiative being conducted in two stages: a pilot study and an impact evaluation and process study. Both stages are being conducted in mixed-aged classrooms that serve 3- and 4-year-olds in community-based child care and Head Start settings that vary in their initial levels of quality. The project is being conducted by MDRC and its partners, Margaret Burchinal at the University of Virginia, MEF Associates, Abt Associates Inc., and RTI International, and is sponsored by the Office of Planning, Research and Evaluation (OPRE) in the Administration for Children and Families, U.S. Department of Health and Human Services.

The VIQI project aims to address the following research questions:

- How do improvements in classroom quality promote children's development?
 - Do different dimensions or specific levels of classroom quality matter for children's development?
 - Do the effects of classroom quality on children's development vary according to child, staff, and center characteristics?
- How do classrooms with different levels of classroom quality or with different levels of readiness to implement an intervention at the beginning of a school year benefit from quality improvement efforts, such as curricula implementation, teacher training, and in-classroom coaching?⁸

In defining classroom quality, the VIQI project hypothesizes three discrete but interrelated dimensions of quality that are based on existing literature and common definitions used in the early care and education field: structural quality, interactional quality, and instructional quality. See Box 1 for more information about how the VIQI project is defining classroom quality.

To assess the effects of quality on children's learning and development, the project aims to create improvements in classroom quality via a three-group, cluster randomized controlled study, in which early care and education centers are randomly assigned to one of two intervention conditions or to a preschool-as-usual control condition. The intervention conditions are two theoretically distinct interventions consisting of curricular and professional development supports. Each intervention is expected to improve multiple aspects of children's development and learning, but to do so by targeting a specific dimension of quality:

- 1 a whole-child, global approach that targets structural and interactional quality
- **2** *an integrated, domain-specific approach* with a particular scope and sequence that targets instructional quality

If the interventions are able to improve their targeted dimensions of quality, this will introduce variation in the *levels of quality* that classrooms are expected to achieve. This variation provides an opportunity to explore the causal relationship between quality and children's outcomes. In fact, the VIQI project leverages two sources of variation—one that is experimentally introduced through the two interventions, and one that is a preexisting, natural variation in the way early care and education settings operate.

THE VIQI PROJECT'S CONCEPTUAL FRAMEWORK

The overarching conceptual framework for the VIQI project can be seen in Figure 1. This framework is informed by the early care and education evidence base, implementation science, and developmental research and theory. It outlines the pathways by which interventions are expected to lead to the anticipated outcomes in line with prior research. It highlights, going left to right, the following components: (1) inputs, or the multilevel drivers that influence how early care and education programs are implemented and the interventions themselves, (2) outputs, or the activities delivered when conducting an intervention, and (3) the outcomes hypothesized in the short term for teachers and for classrooms as well as in the longer term for children. Each of these components of the conceptual framework is described in greater detail below.

Inputs

The conceptual framework includes two sets of inputs expected to influence the programming of the early care and education centers participating in the VIQI project: implementation drivers and the curricular and professional development interventions. Figure 2 provides an in-depth representation of the implementation drivers.

BOX 1

THE VIQI PROJECT'S DIMENSIONS OF QUALITY

The VIQI project builds on existing research and a common definition of quality used in the early care and education field that includes two broad domains: (1) structural quality, which includes structural or physical features of how classrooms are designed and configured; and (2) process quality, which comprises components related to interactions and instruction. The literature views structural quality as necessary but insufficient by itself—that is, it lays a foundation for other aspects of quality.* Although process quality is expected to be more closely linked with children's learning because it focuses on interactions among teachers and children, research shows small and inconsistent links between aspects of process quality and children's outcomes.† Instructional aspects of process quality, however, such as asking open-ended questions, show somewhat stronger links with children's outcomes than other aspects of process or structural quality.‡ Given this body of work, the VIQI project focuses on three dimensions of quality—structural quality and two aspects of process quality—thought to characterize classrooms' overall quality and functioning and hypothesized to influence children's outcomes:

- structural quality, such as the physical features of a classroom (for example, its furniture setup and materials)
- **interactional quality,** which includes the relational aspects of children's interactions with teachers and other children in the classroom as well as the classroom climate and overall classroom management and organization
- **instructional quality,** which includes what is being taught in the classroom and how it is being taught. This includes the content presented, the skill being taught (for example, math, literacy, and social-emotional learning), the activity settings used (for example, whole group and small group), and instructional practices employed (such as asking open-ended questions).

*Maia C. Connors, "Creating Cultures of Learning: A Theoretical Model of Effective Early Care and Education Policy," *Early Childhood Research Quarterly* 36 (2016): 32-45; Vivien Tseng and Edward Seidman, "A Systems Framework for Understanding Social Settings," *American Journal of Community Psychology* 39, 3-4 (2007): 217-228; Martha Zaslow, Rachel Anderson, Zakia Redd, Julia Wessel, Louisa Tarullo, and Margaret Burchinal, *Quality Dosage, Thresholds, and Features in Early Childhood Settings: A Review of the Literature,* OPRE Report 2011-5 (Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2010)

†For example, see Margaret Burchinal, "Measuring Early Care and Education Quality," *Child Development Perspectives* 12, 1 (2018): 3-9; Margaret Burchinal, Martha Zaslow, and Louisa Tarullo, "Quality Thresholds, Features, and Dosage in Early Care and Education: Secondary Data Analyses Of Child Outcomes," *The Society for Research in Child Development* 81, 2 (2016): 1-128; Margaret Burchinal, Kirsten Kainz, and Yaping Cai, "How Well Do Our Measures of Quality Predict Child Outcomes? A Meta-Analysis and Coordinated Analysis of Data from Large-Scale Studies of Early Childhood Settings," pages 11-31 in Martha Zaslow, Ivelisse Martinez-Beck, Kathryn Tout, and Tamara Halle (eds.), *Quality Measurement in Early Childhood Settings* (Baltimore: Paul H. Brookes Publishing Co., 2011); Christina Weiland, Kchersti Ulvestad, Jason Sachs, and Hirokazu Yoshikawa, "Associations Between Classroom Quality and Children's Vocabulary and Executive Function Skills in an Urban Public Prekindergarten Program," *Early Childhood Research Quarterly* 28, 2 (2013): 199-209.

‡ For example, see Burchinal, Kainz, and Cai (2011); Margaret Burchinal, Lynne Vernon-Feagans, Virginia Vitiello, Mark Greenberg, and Family Life Project Key Investigators, "Thresholds in the Association Between Child Care Quality and Child Outcomes in Rural Preschool Children," *Early Childhood Research Quarterly* 29, 1 (2014): 41-51; Margaret Burchinal, Kylie Garber, Tiffany Foster, Mary Bratsch-Hines, Ximena Franco, and Ellen Peisner-Feinberg, "Relating Early Care and Education Quality to Preschool Outcomes: The Same or Different Models for Different Outcomes?" *Early Childhood Research Quarterly* 55, 2 (2021): 35-51; Carollee Howes, Margaret Burchinal, Robert Pianta, Donna Bryant, Diane Early, Richard Clifford, and Oscar Barbarin, "Ready to Learn? Children's Pre-Academic Achievement in Pre-Kindergarten Programs," *Early Childhood Research Quarterly* 23, 1 (2008): 27-50; Andrew J. Mashburn, Robert C. Pianta, Bridget K. Hamre, Jason T. Downer, Oscar A. Barbarin, Donna Bryant, Margaret Burchinal, Diane M. Early, and Carollee Howes, "Measures of Classroom Quality in Prekindergarten and Children's Development of Academic, Language, and Social Skills," *Child Development* 79, 3 (2008): 732-749.

FIGURE 1

Conceptual Framework Underlying the VIQI Project Highlights Pathways by Which the Interventions Lead to Anticipated Outcomes

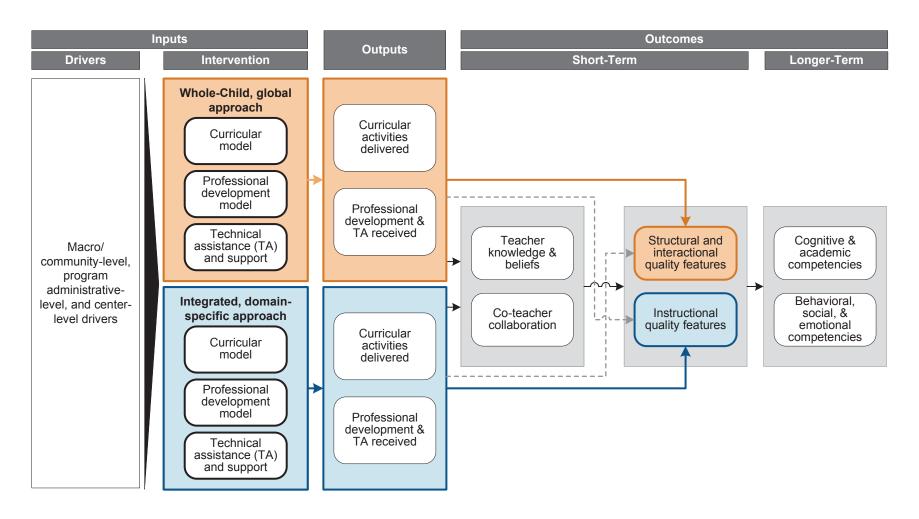
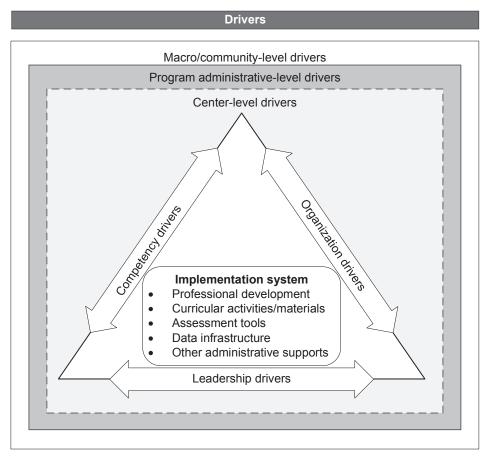


FIGURE 2
In-Depth Representation of Implementation Drivers in the VIQI Project's Conceptual Framework



NOTE: Figure is adapted from the State Implementation & Scaling-Up of Evidence-Based Practices Center (SISEP) and the National Implementation Research Network (NIRN), "Module 2: Implementation Drivers," (Chapel Hill, NC: FPG Child Development Institute, 2016).

Implementation Drivers. Drivers include individual, center, and contextual features that influence how early care and education programs are implemented in the real world. Our model employs one widely used framework as its base, which identifies three kinds of processes at the early care and education center level that are thought to affect whether centers and staff are able to implement an intervention effectively and consistently:¹⁰

- competency drivers—such as the background, experience, attitudes, and knowledge of staff members
- *organization drivers*—such as the funding, equipment, organizational climate, and readiness to take on an initiative
- leadership drivers—such as the leadership and management styles of administrators

Figure 2 also highlights a fourth center-level driver, the *implementation system*, or the existing practices and processes within an early care and education center that support teaching and learning within the classroom. This includes the professional development (training and coaching), curricular activities and materials, assessment tools, data infrastructure, and technical assistance and other supports typically provided to teachers by the early care and education center.

The VIQI project framework shown in Figure 1 also acknowledges that there are larger contextual influences at play—at the program administrative level and at the macro-system/community level. These levels highlight the fact that the implementation of any intervention takes place in classrooms that exist within early care and education centers. In addition, many of those centers are under a larger umbrella organization or a grantee agency (referred to in this brief as the program administrative level) and in an ever-changing landscape of priorities, policies, and practices at the community, district, state, and federal levels. Any of these levels may help facilitate or hinder implementation of an intervention.

Intervention. In the VIQI project, as shown in Figure 1, the selected interventions (both the whole-child, global approach and the integrated, domain-specific approach) each consist of three components: (1) a curricular model that includes curricular materials and activities, (2) a professional development model that includes ongoing training and coaching for lead and assistant teachers, and (3) ongoing technical assistance and support by the project team and curriculum developers. All three components aim to promote the dimension of quality that each intervention is expected to target.

Outputs

The two interventions have several outputs that represent the activities delivered and received when conducting the interventions. In the VIQI project, this means that teachers implement the curricular components with children in their classrooms and receive professional development to help them do so, and the project team and curriculum developers monitor implementation and provide technical assistance. The output boxes in Figure 1 implicitly highlight the importance of fidelity—that is, delivering the intervention as intended—as a necessary link in the chain for the interventions to achieve the intended effects on classroom quality and children's outcomes.

Fidelity is a multidimensional construct and consists of two overarching concepts: (1) *implementation fidelity*, or the extent to which the professional development model and other supports are delivered and received as intended, and (2) *intervention fidelity*, or the extent to which the curricular model is delivered by teachers as intended.¹³

Outcomes

Three sets of cascading effects, or outcomes (also shown in Figure 1), are expected from putting the two interventions in place: (1) short-term improvements in teacher outcomes, such as their knowledge, beliefs, and relationships with co-teachers, (2) short-term improvements in specific dimensions of classroom quality, and (3) longer-term increases in children's learning and development, including their cognitive, academic, behavioral, social, and emotional competencies.

The two intervention approaches being put in place are expected to affect different quality dimensions through two main pathways. Specifically, a whole-child, global approach is hypothesized to primarily affect children's experiences in the classrooms through structural and interactional quality features. In contrast, an integrated, domain-specific approach with broad scope and explicit sequencing of content is hypothesized to primarily affect children's experiences in the classroom though instructional quality features. The gray dotted lines from each of the intervention approaches to the nontargeted dimension of quality (that is, from a whole-child, global approach to instructional quality and from the integrated, domain-specific approach to structural/interactional quality) are meant to show how the interventions may have a secondary influence on the other quality dimension. These two dimensions of quality are interrelated but not completely overlapping. Together, they are thought to characterize classrooms' overall quality and functioning.

Although not depicted in Figure 1, bidirectionality between outputs and outcomes is expected, meaning that changes in outcomes can influence what teachers do in the classroom, the professional development that is provided, and what teachers understand and believe about teaching and learning. For example, if teachers see that children are improving as a result of the curricular activities that teachers are providing, they may feel more motivated to implement the intervention more readily. Or, if teachers notice that a learning activity did not go as planned, they may try to learn more about that activity or a specific skill area—increasing their knowledge. Or they may speak with their coaches about the challenges they are having, which may prompt the coaches to focus their support in a particular way.

PUTTING THE CONCEPTUAL FRAMEWORK INTO PRACTICE

The VIQI pilot study tested the feasibility of the conceptual framework. The framework will be tested more formally in the project's impact evaluation and process study, which was underway during the 2021-2022 school year. The impact evaluation and process study aims to address the project's research questions and explore links between classroom quality and children's outcomes. Because the study is being conducted during the COVID-19 pandemic, some adjustments to the study design have been made.¹⁴

During the 2021-2022 school year, the study team collected information on many of the features in the conceptual model, including various inputs, aspects of implementation, and teacher, classroom, and child outcomes. Data on implementation of the professional development and curricular models were gathered on an ongoing basis for two reasons: to learn how implementation varied over time, and to examine the service contrast—or the differences in services between the two intervention conditions and between each intervention condition and the preschool-as-usual control condition. Such in-depth implementation and outcome information will be used to learn about the conditions that shaped the fidelity of implementation of the interventions, to test the effects of the interventions, and to examine how different levels and dimensions of quality causally relate to children's developmental outcomes.

Subsequent publications will be released that provide more detail on the VIQI project's approach and conclusions from the VIQI pilot study conducted in the 2018-2019 school year.

NOTES AND REFERENCES

- 1 Executive function, also known as cognitive regulation, in early childhood is made up of working memory (or the ability to keep a number of pieces of information in the mind at once), cognitive flexibility (or the ability to flexibly shift between pieces of information), and inhibition (or the ability to stop or repress an immediate response). For example, see Anamarie Auger, George Farkas, Margaret R. Burchinal, Greg J. Duncan, and Deborah Lowe Vandell, "Preschool Center Care Quality Effects on Academic Achievement: An Instrumental Variables Analysis," Developmental Psychology 50, 12 (2014): 2559-2571; Margaret Burchinal, Martha Zaslow, and Louisa Tarullo, "Quality Thresholds, Features, and Dosage in Early Care and Education: Secondary Data Analyses Of Child Outcomes," Monographs of the Society for Research in Child Development 81, 2 (2016): 1-128.
- 2 For example, see Burchinal, Zaslow, and Tarullo (2016); Margaret Burchinal, Kirsten Kainz, and Yaping Cai, "How Well Do Our Measures of Quality Predict Child Outcomes? A Meta-Analysis and Coordinated Analysis of Data from Large-Scale Studies of Early Childhood Settings," pages 11-31 in Martha Zaslow, Ivelisse Martinez-Beck, Kathryn Tout, and Tamara Halle (eds.), Quality Measurement in Early Childhood Settings (Baltimore: Paul H. Brookes Publishing Co., 2011); Sandra L. Soliday Hong, Terri J. Sabol, Margaret R. Burchinal, Louisa Tarullo, Martha Zaslow, and Ellen S. Peisner-Feinberg, "ECE Quality Indicators and Child Outcomes: Analyses of Six Large Child Care Studies," Early Childhood Research Quarterly 49 (2019): 202-217.
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- 5 Head Start has the largest federal appropriation for early childhood education in the nation. Head Start provides comprehensive programming in areas of early learning, health, and family well-being to children ages birth to five and their families.
- 6 The Q-DOT project was sponsored by the Office of Planning, Research, and Evaluation in the Administration for Children and Families, U.S. Health and Human Services.
- 7 Burchinal, Zaslow, and Tarullo (2016); Martha Zaslow, Rachel Anderson, Zakia Redd, Julia Wessel, Louisa Tarullo, and Margaret Burchinal, Quality Dosage, Thresholds, and Features in Early Childhood Settings: A Review of the Literature (Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, 2010).
- 8 The coaching model being used in VIQI consists of two components: time spent working with teachers as they implement instructional activities in their classrooms and time spent in a meeting with the coach and teachers.
- **9** For example, see Michael J. Weiss, Howard S. Bloom, and Thomas Brock, "A Conceptual Framework for Studying the Sources of Variation in Program Effects," *Journal of Policy Analysis and Management* 33, 3 (2014): 778-808.

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- 14 The impact evaluation and process study was initially planned for the 2020-2021 school year but was postponed because of the COVID-19 pandemic. Due to the pandemic, some elements of the design have been adjusted. For instance, when the study began (fall 2021), information on classroom quality was collected through live-streamed classroom observations, all teacher training sessions were conducted virtually, and coaching was done remotely through live-streamed coaching sessions.

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